

PHYS 162
1/23/25
Dennis Brown

Problem Set #1

1. The way scientist know that a hypothesis in astronomy is a reasonable description of nature is to do experiments and observations about the predictions of the hypothesis.
2. A light year is the distance that light travels in one year.
3. The Star that provides energy for life on Earth is the Sun.
4. The location of the Earth in the Milky Way Galaxy is a little less than 30,000 LY from the center.
5. Adding a proton to the nucleus of an atom and one electron along with it, changes that atom into a new element.
6. If you increase a values by an "order of magnitude", you have increased that value by a factor of 10.

$$7. \quad V = 670 \times 10^6 \text{ mi/hr} \quad d = 1 \text{ year} \times 670 \times 10^6 \text{ mi/hr} \times \frac{365 \text{ days}}{1 \text{ yr}} \times \frac{24 \text{ hrs}}{1 \text{ day}}$$

$$V = \frac{d}{t} \rightarrow t \times V = \frac{d}{V} \times V \quad d = 670 \times 10^6 \times 365 \times 24$$

$$t \times V = d \quad 5.873 \cdot 10^{12} \text{ miles in a light year}$$

$$8. \quad V = 61,146 \text{ km/hr} \quad \frac{\text{km}}{\text{hr}} \quad 1 \text{ light year} = 9.461 \times 10^{12} \text{ km}$$

$$d = 4.3 \text{ light years} \quad 4.3 \text{ light years} \times 9.461 \times 10^{12} \frac{\text{km}}{\text{light yr}} = 4.3 \times 9.461 \times 10^{12} \text{ hr}$$

$$V = \frac{d}{t} \quad \frac{4.3 \times 9.461 \times 10^{12} \text{ km}}{61,146 \frac{\text{km}}{\text{hr}}} \times \frac{1 \text{ day}}{24 \text{ hrs}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

$$t \times V = d, \quad t = \frac{d}{V}$$

It will take 7.589×10^4 years for Voyager 1

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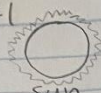
9.



Moon



Jupiter



Sun



Galaxy

10. It is true that Scientific models are always an approximation of nature
11. It is true that scientific models and hypotheses can change as new experiments or observations are done, often with better equipment
12. It is false that the nearest star (other than the Sun) is much less than a light year away.
13. Yes I read the syllabus
14. Yes I read the Example Problem Sets
15. Yes I listened to the tutorial on converting jpegs to pdfs.
16. The Physics Tutor Room is located in Faraday East Room 251